

## MICRO SPEAKER UNIT

### CROSS REFERENCE

Applicant claims the benefit under 35 U.S.C. Section 365 of  
5 International Application PCT/KR2006/002349, filed July 20, 2006  
which claims the respective benefits of Korean Patent Application  
No. 10-2005-0053283, filed June 21, 2005 and Korean Patent  
Application No. 10-2006-0055204, filed June 20, 2006.

### TECHNICAL FIELD

10 The present invention relates to a micro speaker unit, and  
in particular to a micro speaker unit which is capable of  
protecting a human body from a magnetic field which occurs from a  
micro speaker.

### BACKGROUND ART

15 Generally, a micro speaker unit is designed to generate  
sounds based on intensive air waves which are generated in such a  
manner that a diaphragm vibrates surrounding air, with the  
20 diaphragm being vibrated by an attractive force and a repulsive  
force which occur by a polar change of current applied to a moving  
coil with respect to a magnetic field of a magnet.

Here, a magnetic field generated by the micro speaker unit  
is harmful to a human body.

So, a certain construction is urgently needed for protecting a human body from a harmful magnetic field which occurs from a micro speaker unit.

In order to decrease a harmful magnetic field generating from a micro speaker unit, a micro speaker unit is connected with a user's ear using a thin hose, while keeping a certain distance from a human body.

However, the method of connecting a micro speaker unit and a user's ear using a hose has a problem that a degradation of a sound characteristic cannot be overcome due to surrounding noises applied to a hose.

In addition, the method of connecting a micro speaker unit and a user's ear using a hose should be additionally provided with a hose, the construction becomes complicated.

#### TECHNICAL PROBLEM

Accordingly, it is an object of the present invention to provide a micro speaker unit which overcomes the problems encountered in the conventional art.

It is another object of the present invention to provide a micro speaker unit which is capable of protecting a human body from harmful magnetic fields which occur from a micro speaker unit.

## TECHNICAL SOLUTION

To achieve the above objects, there is provided a micro speaker unit which comprises a frame in which a receiving part is formed at a center portion of the same, and a plurality of damping holes are formed at an outer side of the receiving part at certain intervals; a diaphragm which is provided at the receiving part for generating vibrations; a magnet which is installed in an interior of the diaphragm; a protector which is coupled at the frame for thereby covering the receiving part and the damping hole of the frame; a moving coil which is installed at a center portion of the protector and corresponds to the magnet; and a magnetic field radiating part which is provided at the frame for radiating magnetic fields generated by the magnet and the moving coil to the outside of the frame.

## ADVANTAGEOUS EFFECTS

The present invention can be well adapted to a cellular phone, a head set or an earphone. An applicable range of the present invention is very wide and diverse.

In addition, the magnetic fields generated from the micro speaker are radiated in an outer direction, so that it is possible to protect a human body from magnetic fields.

The magnetic fields generated from the micro speaker are radiated in a direction reverse to a human body by the magnetic field radiating part provided at the micro speaker, so that the

magnetic fields do not influence a human body.

#### DESCRIPTION OF DRAWINGS

The present invention will become better understood with  
5 reference to the accompanying drawings which are given only by  
way of illustration and thus are not limitative of the present  
invention, wherein;

Figure 1 is a perspective view illustrating a micro speaker  
unit according to the present invention;

10 Figure 2 is a disassembled perspective view illustrating a  
micro speaker unit according to the present invention;

Figure 3 is a cross sectional view illustrating a micro  
speaker unit according to the present invention; and

15 Figure 4 is a disassembled sectional view illustrating a  
micro speaker unit according to the present invention.

#### BEST MODE

The preferred embodiments of the present invention will be  
described with reference to the accompanying drawings.

20 Figure 1 is a perspective view illustrating a micro speaker  
unit according to the present invention. Figure 2 is a  
disassembled perspective view illustrating a micro speaker unit  
according to the present invention. Figure 3 is a cross sectional  
view illustrating a micro speaker unit according to the present  
25 invention. Figure 4 is a disassembled sectional view illustrating

a micro speaker unit according to the present invention.

As shown in Figures 1 through 4, a circular frame 10 is provided. A receiving part 11 (receiving groove) is formed at a center portion of the frame 10 with a certain depth. A plurality of damping holes 13 are formed at an outer portion of the receiving part 11 at certain regulars in a radial shape. Here, multiple damping holes 13 are provided for increasing an aperture ratio so that sounds can be efficiently outputted to a backside of the speaker.

A diaphragm 17 is provided at the receiving part 11 of the frame 10 to generate vibrations. A magnet 15 is installed in the interior of the diaphragm 17. A protector 20 is coupled at the frame 10 so that the receiving part 11 and the damping holes 13 are covered. The vibrations of the diaphragm 17 are controlled by an aperture ratio of the damping holes 13, so that the quality of sounds is controlled.

A moving coil 21 is installed at a center portion of the protector 20, while corresponding to the magnet 15 received in the receiving part 11. A magnetic field radiating hole 31 of a magnetic field radiating part 30 is formed at a center portion of the frame 10 for radiating magnetic field generating by the magnet 15 and the moving coil 21 to the outside of the frame 10. A magnetic field guide path 16 having the same diameter as the magnetic field radiating hole 31 is formed at a center portion of the magnet 15.

A spacer 40 is provided in the interior of the frame 10 so as to maintain a certain distance between the frame 10 and the diaphragm 17.

A cover 50 is coupled at a backside of the frame 10 to protect the inner constructions of the frame 10. A cover hole 51 is formed at a center portion of the cover 50 so that a user can hear sounds. Here, the protector 20 and the cover 50 may be integrally formed. The protector 20 is closely contacted with the frame 10 so that the spaces between the frame 10 and the cover 50 are separated.

The operation and effect of the present invention will be described as follows.

In the present invention, as intensive air waves are generated in the air of the front side of the diaphragm 17 based on a cooperation between the magnet 15 and the moving coil 21, the magnetic field generated by the magnet 15 are radiated in an outer direction of the speaker through the magnetic field guide path 16 and the magnetic field radiating hole 31 of the magnetic field radiating part 30 formed at the center of the frame 10.

Here, since the magnetic field is radiated in a direction reverse to a human, the user is protected from the magnetic field by the magnetic field radiating part 30.

In the present invention, since the aperture ratio of the frame 10 increases by the damping holes 13, the diaphragm 17 is restricted from its free vibrations. The user can hear sounds

from the cover hole 51 formed at the center of the cover 50. Noises are discharged by the damping hole 13 of the frame 10 positioned at the front side of the cover 50, and a good quality of sounds is transferred to the user's ear by the cover hole 51 of the cover 50.

#### INDUSTRIAL APPLICABILITY

As described above, the present invention can be well adapted to a cellular phone, a head set or an earphone. An applicable range of the present invention is very wide and diverse.

In addition, the magnetic fields generated from the micro speaker are radiated in an outer direction, so that it is possible to protect a human body from magnetic fields.

The magnetic fields generated from the micro speaker are radiated in a direction reverse to a human body by the magnetic field radiating part provided at the micro speaker, so that the magnetic fields do not influence a human body.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described examples are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that

fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced by the appended claims.